Issue: Establish Shortage Criteria and Identify Impacts; Establish a Process to Measure Effects, Volume and Cost for Alternative Actions

draft

Summary

The primary focus of the discussion among the 7 Basin States and Reclamation has been to identify practices that will avoid the requirement to officially determine a shortage of Colorado River supplies. Rational decisions cannot be made unless firm shortage criteria are established. Arizona, CAP, Mexico, Nevada, power interests, and others need to know the circumstances and the impacts of a shortage. With the rapidly increasing possibility of a shortage, we must establish shortage criteria and formally adopt Upper Basin release criteria.

This paper suggests a process for establishing those criteria and presents a model that can be used to evaluate the impacts of alternative actions. It further suggests a process to identify the effects, value, and cost of those alternatives so that regulated transactions might be made among entities to change the impacts from the baseline criteria.

Background

The Secretary of the Interior (Secretary) is required to annually declare the Colorado River water supply as normal, surplus, or shortage. The system has experienced many normal and surplus years. The Secretary has adopted Flood Control Regulations, Interim Surplus Guidelines, coordinated Long Range Operating Criteria, a 70R hydrologic determination for surplus, 602(a) storage determination and other operating rules. A shortage has never been declared and no shortage criteria have been developed. Reservoir supplies are dropping. Meeting growing demands with normal water supplies is becoming increasingly difficult in California and Nevada. Mexico has grown accustomed to receiving more than the 1.5 maf/year Treaty allocation. Drought conditions are causing local area shortages in the Upper Basin states.

Those states, particularly Colorado, are beginning to question the minimum objective release of 8.23 maf/year from Lake Powell.

It has been the history of Reclamation and the 7 Basin States to develop and implement appropriate guidelines and regulations when needed. The need and the time for shortage criteria are here. We must focus on developing baseline shortage criteria for Reclamation to adopt and implement that addresses reservoir trigger elevations, allocation of the shortage supply, and release criteria for Lake Powell and Lake Mead as needed. These criteria should be based on water supply and hydrologic conditions, not on economic criteria. The criteria must be consistent with the Law of the River and contractual commitments. With baseline criteria clearly established, affected entities can begin to identify arrangements to trade off impacts, costs and benefits, i.e., land fallowing, protecting power generation, etc.

Shortage criteria consists of establishing a reservoir elevation that will be protected (operate to stay above that elevation) and then determining the timing, amount and duration of demand reduction necessary to protect that elevation in anticipation of potential hydrologic events and the resultant water supply. Reclamation has modeled several scenarios of hydrologic events and assumed shortage criteria. We gained sufficient information from that process to begin to evaluate specific criteria and identify the impacts. CAP staff has employed a simplified modeling process to quickly identify the impacts on varied assumptions.

Attached are three different examples of shortage criteria and the resultant impacts. All assume the historic hydrologic trace from 1953 thru 1973 beginning in 2005. The water supply is averaged or straight-lined for 1953 to 1964 with a natural flow of 12.07 maf/year and 1968 thru 1973 at 14.80 maf/year. All assume an 8.23 maf/year release from Powell. Shortages are

allocated 3% to Nevada, 17% to Mexico, and 80% to Arizona (.3/9.0, 1.5/9.0, (2.8+4.4)/9.0). The results shown are the end of year elevation at Lake Powell, the elevation of Lake Mead while protecting the elevation at either 1000 or 1050, and amount of shortage using either a stepped up shortage plan or allocating shortage as it occurs.

This kind of analysis allows us to quickly see the changed impacts from different assumptions. For example, in order to protect a minimum power pool of 1050 at Lake Mead instead of elevation 1000, requires a maximum shortage of 1.0 maf/yr beginning in 2009 instead of a max shortage of 770,000 af beginning in 2011. Another example shows that to protect minimum power pool at Lake Powell, the Upper Basin would need to reduce upstream uses by about 250,000 af/year for six (6) years. It allows decision makers to evaluate who is harmed and how much by the greater shortage and who benefits and by how much from maintaining power production.

Conclusion

The Reclamation Colorado River model can be used to provide a similar tool with greater accuracy so that we can readily identify the impacts, benefits and impacted entities. The difficult part will be achieving consensus on the baseline criteria. Reclamation's role should be to lead the process both for technical modeling and for identifying baseline criteria. Reclamation has successfully led similar processes for the Interim Surplus Guidelines and the In Advert Overrun Payback Guidelines. The time is now.

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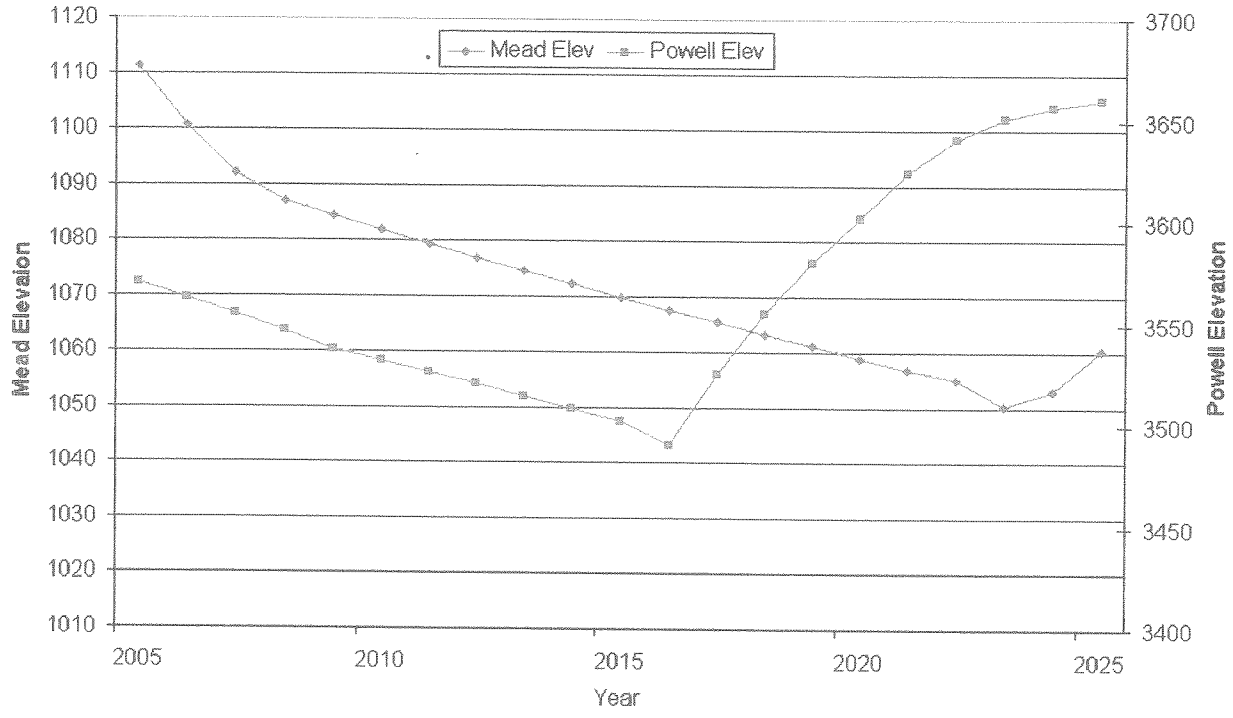
Attachment

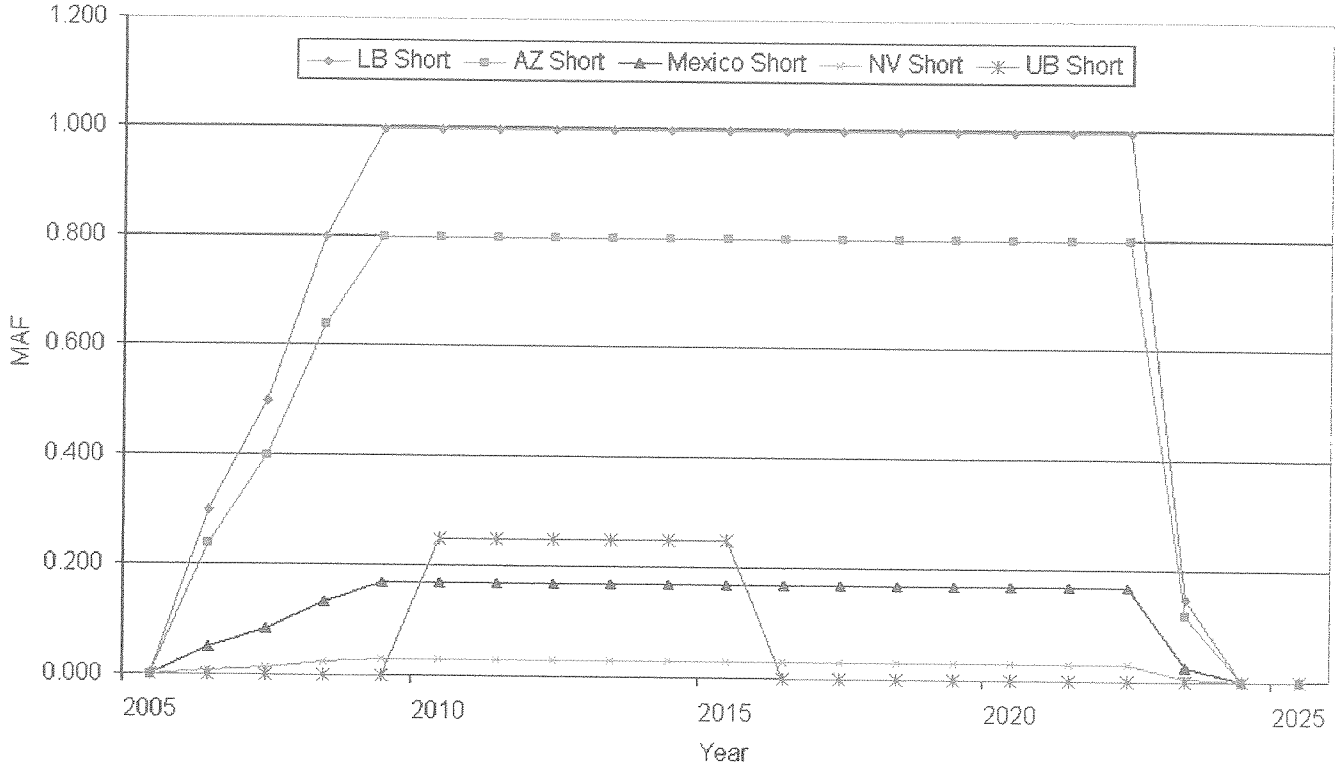
Powell/Mead Elevation

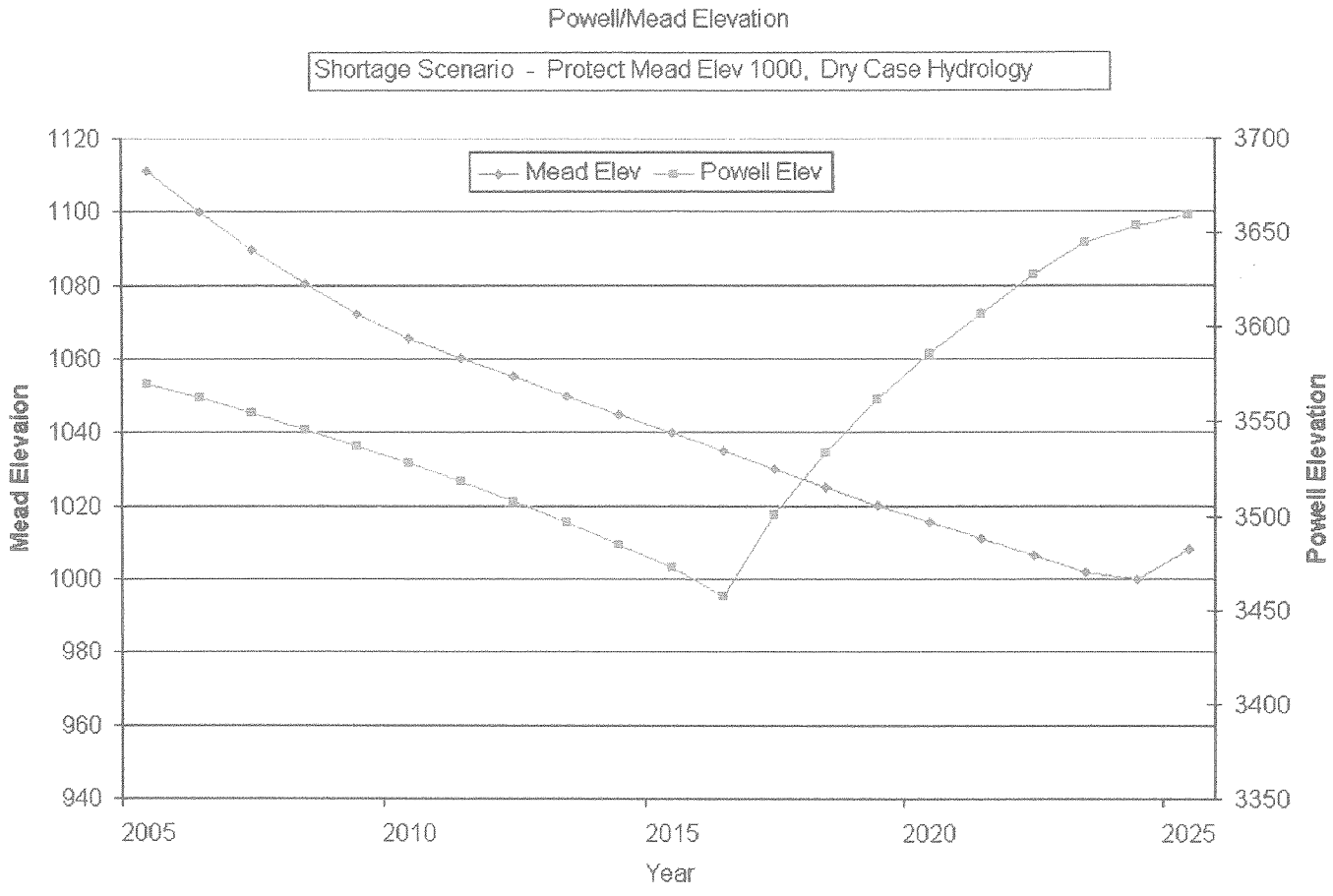
Shortage Scenario - Protect Mead Elev 1050, Dry Case Hydrology, Protect Powell Elev 3490 (Power pool) w/ UB short

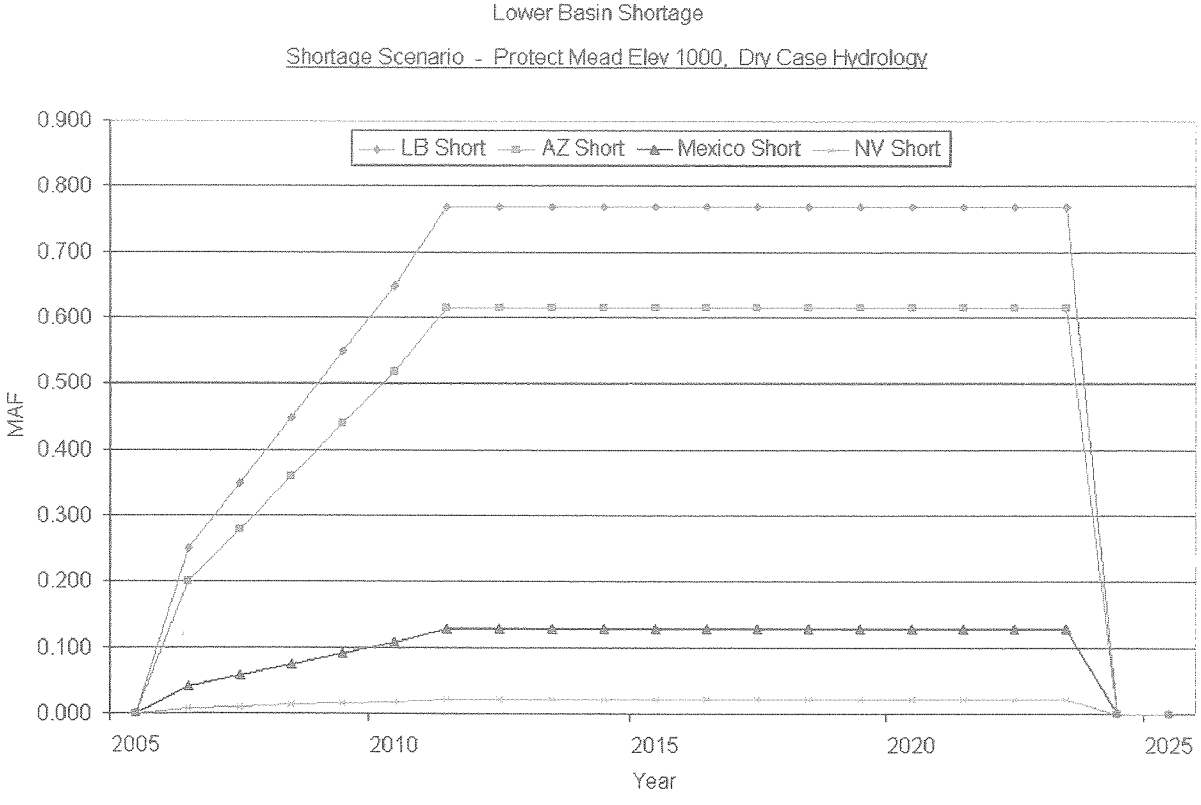


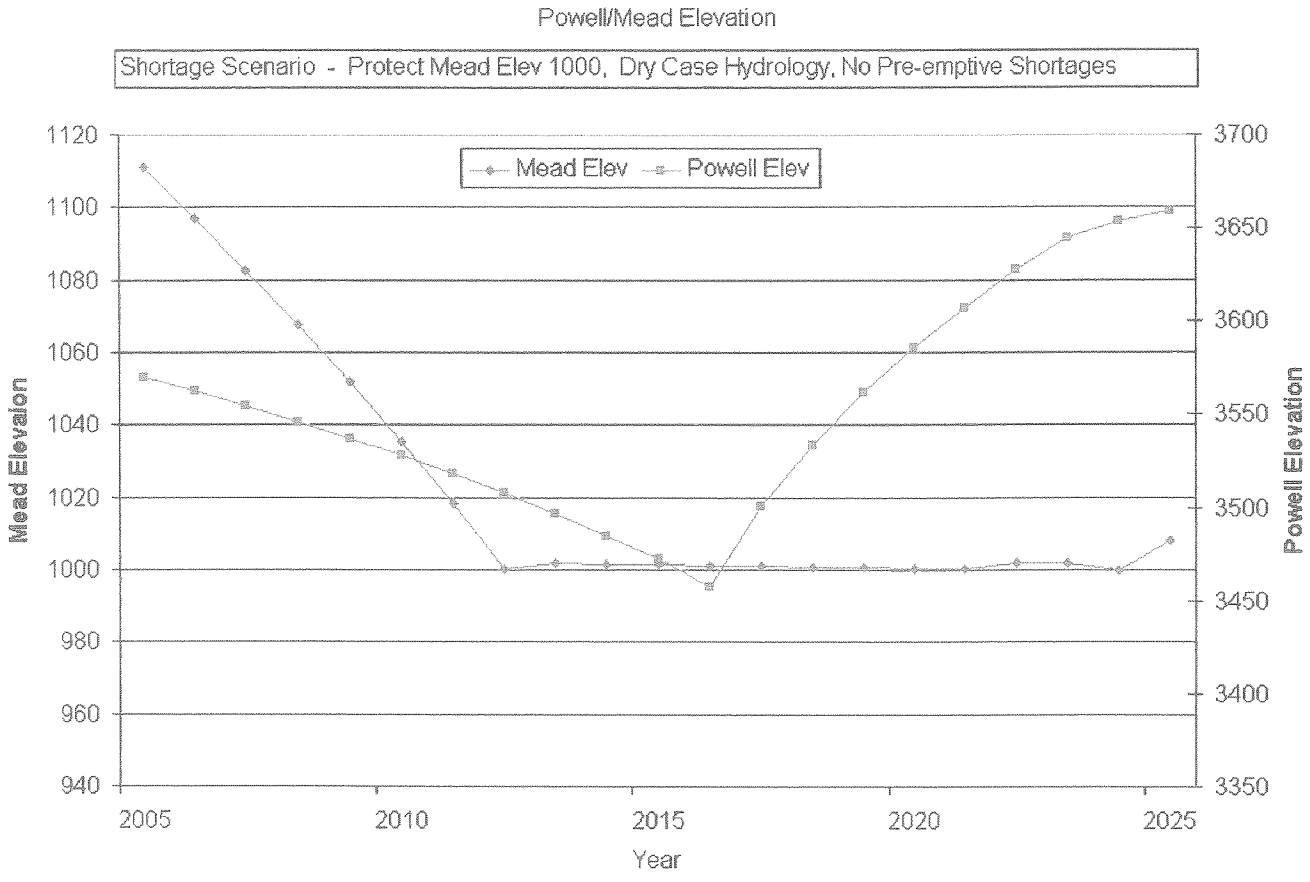
Lower and Upper Basin Shortage

Shortage Scenario - Protect Mead Elev 1050, Dry Case Hydrology, Protect Powell Elev 3490 (Power pool) w/ UB short




Powell/Mead Elevation
Shortage Scenario - Protect Mead Elev 1000, Dry Case Hydrology
Mead Elev
Powell Elev
Mead Elevation
Powell Elevation
1120
1100
1080
1060
1040
1020
1000
980
960
940
3700
3650
3600
3550
3500
3450
3400
3350
2005
2010
2015
2020
2025
Year


Lower Basin Shortage
Shortage Scenario - Protect Mead Elev 1000, Dry Case Hydrology
LB Short
AZ Short
Mexico Short
NV Short
MAF
0.900
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
2005
2010
2015
2020
2025
Year


Powell/Mead Elevation
Shortage Scenario - Protect Mead Elev 1000, Dry Case Hydrology, No Pre-emptive Shortages
Mead Elev
Powell Elev
Mead Elevation
Powell Elevation
1120
1100
1080
1060
1040
1020
1000
980
960
940
3700
3650
3600
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2005
2010
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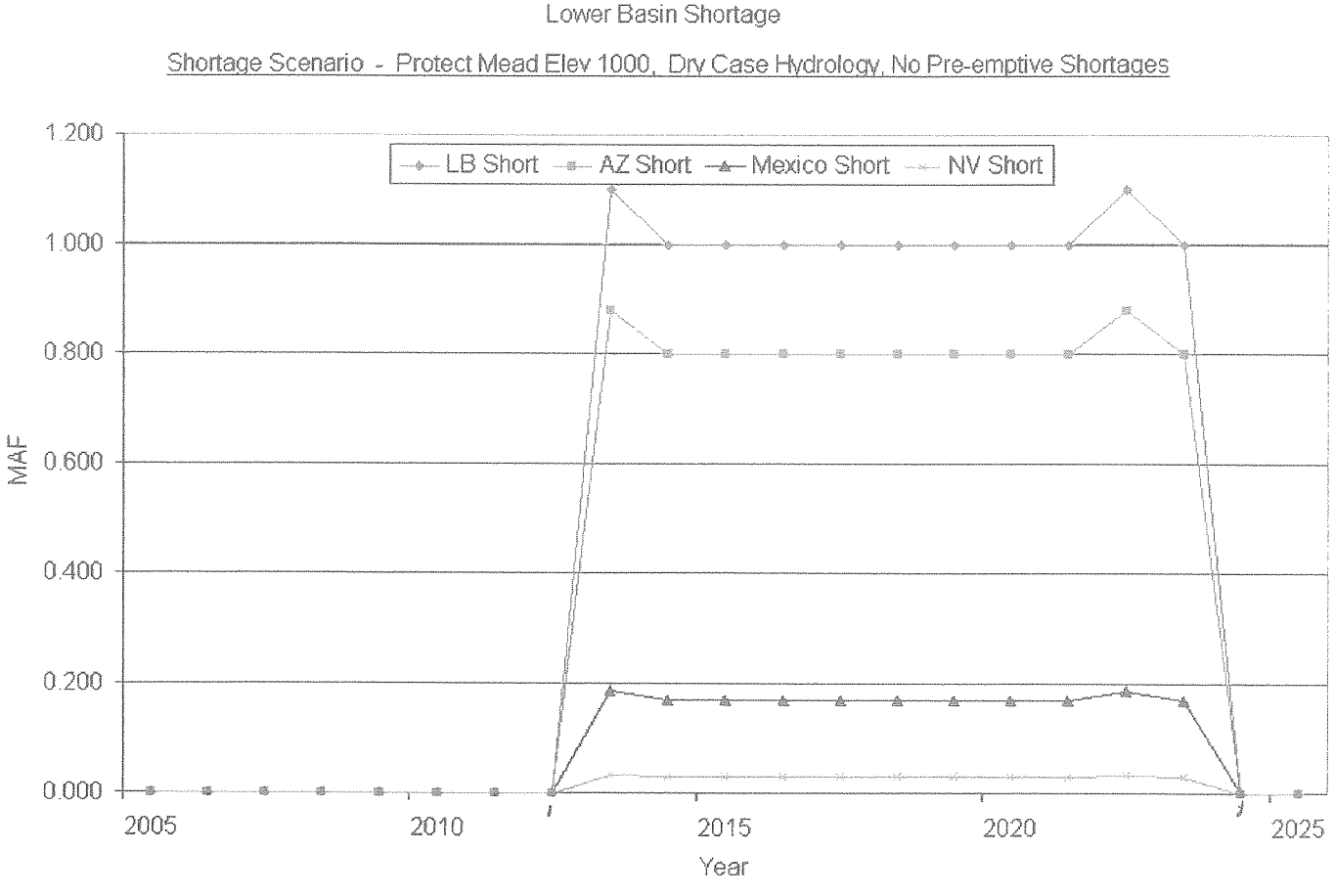
Year


Lower Basin Shortage
Shortage Scenario - Protect Mead Elev 1000, Dry Case Hydrology, No Pre-emptive Shortages
LB Short
AZ Short
Mexico Short
NV Short
MAF
1.200
1.000
0.800
0.600
0.400
0.200
0.000
2005
2010
2015
2020
2025
Year